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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,017	02/19/2004	Dong Yu	NSL-029	7331
27652	7590	12/31/2007		
JOSHUA D. ISENBERG JDI PATENT 809 CORPORATE WAY FREMONT, CA 94539			EXAMINER BARTON, JEFFREY THOMAS	
			ART UNIT	PAPER NUMBER
			1795	
			MAIL DATE	DELIVERY MODE
			12/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/782,017

Applicant(s)

YU ET AL.

Examiner

Jeffrey T. Barton

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 and 61-84 is/are pending in the application.
- 4a) Of the above claim(s) 1-51 and 72-74 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 75-84 is/are allowed.
- 6) ☒ Claim(s) 66 and 69 is/are rejected.
- 7) ☒ Claim(s) 61-65, 67, 68, 70 and 71 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20040219, 20061221</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, Species D, and Species i in the reply filed on 05 October 2007 is acknowledged. Group I corresponds to the method claims, 1-51, 61-71, and 75-84. Accordingly, claims 72-74 drawn to photovoltaic cells are withdrawn as drawn to a non-elected invention. Species D corresponds to claims 75-84, and claim 61 is generic to the species in that it is open to methods according to any among (but not more than one of) Species A-D, as presented in the restriction requirement of 26 September 2007. Accordingly, claims 1-51 are withdrawn from consideration as drawn to nonelected species. Since Species D was elected by Applicant, no additional claims were withdrawn due to the election of Species i, because no elected claims were drawn to specific methods of forming nanoparticles. Therefore, claims 1-51 and claims 72-74 stand withdrawn.

In Applicant's response of 05 October 2007, Applicant states that claims 1, 13, 40, 61, and 75 are deemed generic, and that claims 1-5, 7-11, 13, 15, 32, 34-51, 61-71, and 75-84 read on the elected species. This is not consistent with the requirement for election of species, and the Examiner disagrees. As stated in the restriction requirement of 26 September 2007, claims 1, 13, 40, 61, and 75 are considered generic to the various species i-xvii drawn to ways of forming nanoparticles, but they are certainly not generic to the species A-D drawn to methods of forming liquids. Claims 1, 13, 40, and 75 are each drawn to a separate species of forming an ink, which are not generic to each other. Claims 1 and 13 require nanoparticles of Group IIIa metals, as

opposed to claims 40 and 75 which require liquid Group IIIa metals. Claim 40 specifies particle size ranges, while claim 75 requires mixing of a suspension comprising a liquid metal with a plurality of nanoparticles, which is not required in any other species A-C.

As stated in the requirement for restriction mailed 26 September 2007, there is an examination and search burden for these patentably distinct species A-D due to their mutually exclusive characteristics. The species require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search queries); and/or the prior art applicable to one species would not likely be applicable to another species; and/or the species are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

As stated below, the claims drawn to elected Species D are considered patentably distinct from the prior art. 37 CFR 1.141 calls for the rejoinder of species "provided the application also includes an allowable claim generic to all the claimed species and all the claims to species in excess of one are written in dependent form or otherwise include all the limitations of the generic claim". This is not the case in the instant application. Claim 61 as currently written does not require the limitations of the nonelected species. The claim is drawn to a method including a step of "using the method of claim 1, 13, 40, or 75". This claim is deemed allowable as dependent on claim 75. However, as dependent on claim 75, claim 61 is not open to any of the nonelected species A-C. In addition, Claims 1, 13, and 40 do not require all limitations of the generic claim. Therefore, rejoinder of Species A-D is not required.

For these reasons, claims 1-51 and 72-74 are withdrawn from consideration, and claims 61-71 (as corresponding to elected Species D) and 75-84 are pending and examined herein.

Claim Objections

2. Claims 75 and 79 are objected to because of the following informalities: In line 3 of claim 75, "comprises of" is recited, although it appears "comprises" was intended. In addition, in line 4 of claim 75, "comprise of" is recited, although it appears "comprise" was intended. In line 1 of claim 79, "mixable" is recited although it appears "miscible" was intended. Appropriate correction is required.
3. Claims 61-71 are objected to because claim 61 is written as optionally dependent upon nonelected claims 1, 13, and 40. Claim 61 should be amended to depend upon only claim 75, which corresponds to elected species D.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 66 and 69 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 66 provides for "exposing the coiled substrate to selenium vapor", which is a step also recited in claim 61. It is unclear whether these recitations correspond to the same step or different steps.

Claim 69 recites "the layer of material", which has insufficient antecedent basis. It appears the claim was intended to depend from claim 68.

Allowable Subject Matter

6. Insofar as they require the limitations of claim 75, claims 61-65, 67, 68, 70, and 71 are allowed. Claims 75-84 are allowed.

7. Insofar as they require the limitations of claim 75, claims 66 and 69 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

8. The following is a statement of reasons for the indication of allowable subject matter:

The closest prior art is considered to be Eberspacher et al (US 2002/0006470), which teaches deposition of I-III-VI semiconductor layers through deposition of a slurry comprising nanoparticles comprising Group I and III metals, followed by heating and exposure to selenium vapor. (See paragraphs 0084-0086; 0053-0056; and 0100)

However, Eberspacher et al do not disclose a slurry or suspension comprising a liquid metal as required in claim 75. Reactions to form the product selenide and intermediate solid-phase mixed-metal species are disclosed taking place below 150 °C (Paragraph 0100). For disclosed nanoparticles comprising, e.g. metallic indium and copper

(Paragraph 0085), any hypothetical melting of indium, if present in pure form, would take place at 156 °C, which would be after the boiling of the slurry solvents disclosed (Paragraph 0055), and based on the disclosure of paragraph 0100, solid-state alloying or selenization reaction would likely take place before melting of the indium material. Based on this, it is not clear that liquid Group IIIa metal could be present within the methods of Eberspacher et al. Beyond this, there is simply no teaching or suggestion of mixing a suspension comprising a liquid group IIIa metal with nanoparticles. For these reasons, claim 75 is considered allowable.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

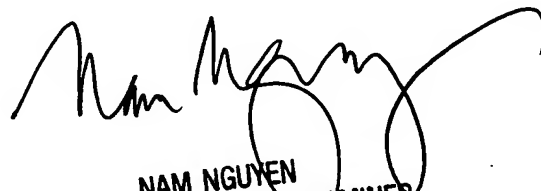
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTB
20 December 2007



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